

1 Translation of the Italian Patent Application No.  
2 VI93A000078

3 TITLE

4 CHAIN MESH NETWORK HOSE

5 ABSTRACT

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7 The invention discloses a hose (10) which comprises at  
8 least one tubular layer (3) of plastic or rubber material,  
9 a mesh-network (4) of the chain type presenting mesh lines  
10 (5) and mesh rows (6) having a tubular shape being wound on  
11 the external surface of said inner layer, a possible exter-  
12 nal layer (7), and is characterized in that said mesh rows  
13 are slanted in relation to the longitudinal axis of the  
14 hose. According to a preferred embodiment the lines (5) of  
15 said meshes are slanted in relation to the longitudinal  
16 axis Y of the hose, following a direction opposite to the  
17 direction of the mesh rows (6).

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19 FIGURE

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Fig. 1

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1 Description of the industrial invention being titled:  
2 "CHAIN MESH NETWORK HOSE"  
3 In the name of FITT SPA - Via Astico, 40 - 36030 FARA  
4 VICENTINO (VI).

5 DESCRIPTION

6 The invention concerns a hose made of plastic or rubber  
7 material and reinforced with a mesh stocking for bearing  
8 fluids under pressure in the hydraulic sector or even in  
9 field of the distribution of fluids under pressure in open  
10 or closed circuits.

11 It is a known fact that the hoses mostly made of plastic  
12 material and suitable to bear fluids under pressure, pre-  
13 sent a first internal tubular layer made of plastic mate-  
14 rial or rubber, which is lined with a tubular fabric having  
15 the purpose of increasing the pressure resistance of the  
16 hose, of reducing its deformation and of increasing its  
17 performances.

18 One of the most used types of hose suited for the purpose,  
19 is the so-called "latticed" hose, in which the tubular  
20 layer of plastic material is reinforced with a series of  
21 threads wound in a spiral over the hose, said threads being  
22 arranged parallel, equally spaced and overlaying as many  
23 other transversal threads arranged at a symmetrical angular  
24 position in relation to an axis parallel to the hose axis,  
25 so as to form a regular rhombus lattice. This latticed  
26 fabric, wound on the external surface of said inner hose  
27 layer, is then attached through another external layer  
28 generally, but not necessarily, transparent which secures  
29 the latticed fabric to the hose itself. With this type of  
30 stocking the hose is suitable to bear a higher pressure  
31 than a hose without stocking, without any substantial  
32 deformations occurring, since the weaving does not yield  
33 and therefore prevents the inner layer of the hose from  
34 deforming.

35 A limit of the just described latticed hose consists in

1 that its flexibility is relatively low, i.e. the bending  
2 radiuses under which the hose can be subjected, are rather  
3 wide in relation to the meshed hoses.

4 Another type of just as well-known flexible hose is the  
5 hose in which the stocking wound over the external part of  
6 the hose is made in the shape of a network. It is a known  
7 fact that the network is a special kind of weaving obtained  
8 with one or more threads which are linked together with  
9 more or less winding loops, also called "bushes" or  
10 "elementary meshes", which give to said mesh-network fabric  
11 a characteristic of high elasticity.

12 The so-called "chain" mesh-network, consists of a series of  
13 threads parallel to one another and fed by many reels,  
14 which are bent so as to obtain as many rows of meshes  
15 having a tie both following the weft direction and the  
16 chain direction, their interlacing creating a transversal  
17 series of mesh lines and a longitudinal series of mesh  
18 rows, or ribs.

19 One of the most used hoses in the market, is the hose  
20 wherein the network is of the tricot chain type. It will be  
21 understood that in the technical jargon of the field the  
22 tricot mesh-network is the type of mesh-network wherein  
23 each thread forms the mesh by interlacing with one or more  
24 threads on its right and with one or more threads on its  
25 left.

26 If, on one hand, the tricot mesh-network hose presents a  
27 higher flexibility, since, as is known, the mesh becomes  
28 more flexible when the hose diameter increases because of  
29 the increased pressure, on the other hand, the limit of the  
30 mesh fabric and in particular of the hose with the tricot  
31 mesh, is that with the pressure increase, the hose is  
32 subjected to a torsional effect caused by the fluid flowing  
33 under pressure within the same. This is due to the spiral  
34 run of the mesh lines which, as opposed to the essentially  
35 longitudinal run of the rows, cause an out-of-balance

1 reaction and in particular a torque of the hose.

2 The main proposed purpose of the invention is to eliminate  
3 the above mentioned inconveniences.

4 In particular the torque effect which occurs in the mesh-  
5 network fabric is to be eliminated, without having to  
6 sacrifice the advantages offered by the mesh-network as  
7 regards the flexibility and the pressure explosion.

8 All the above mentioned purposes and others which will be  
9 better pointed out hereinafter, are obtained with the hose  
10 according to the invention which, in accordance with the  
11 content of the first claim, comprises, from the interior to  
12 the exterior:

13 - at least one inner tubular layer of plastic or rubber  
14 material;

15 - a chain-type mesh-network presenting mesh lines and mesh  
16 rows, having a tubular shape and wound on the external  
17 surface of said inner layer;

18 - a possible external layer for the protection of said  
19 mesh-network, characterized in that said mesh rows are  
20 slanted in relation to the longitudinal axis of the hose.

21 Further characteristics and scope of applicability of the  
22 present invention will become apparent from the detailed  
23 description given hereinafter. However, it should be under-  
24 stood that the detailed description and specific example,  
25 while indicating a preferred embodiment of the invention,  
26 are given by way of illustration only, since various chan-  
27 ges and modifications within the spirit and scope of the  
28 invention will become apparent to those skilled in the art  
29 from this detailed description and from the drawings,  
30 wherein:

31 - Fig. 1 shows a front view of a hose coated with a chain  
32 mesh-network according to the known technique;

33 - Fig. 2 shows the hose according to the invention;

34 - Fig. 3 is a cross-section of the hose of Fig. 2.

35 With reference to the mentioned Figures, it can be observed

1 that the hose mesh-network of Fig. 1, showing a hose with a  
2 mesh-network manufactured according to the known technique,  
3 is formed by chain meshes of the tricot type. Said meshes  
4 form some lines, indicated with 1, parallel to one another,  
5 and some longitudinal rows, indicated with 2, which are  
6 essentially parallel to the X axis of the hose.

7 This type of mesh weaving is directly realized on the hose  
8 20 by so-called mesh-weaving machines, which are present on  
9 the market, their performance in mesh forming being well  
10 known.

11 Fig. 2 shows the hose according to the invention, wherein,  
12 on the inner layer 3 of the hose 10 the chain mesh-network,  
13 indicated as a whole with 4, is woven, it being formed by  
14 lines 5, parallel to one another, slanted in relation to  
15 the Y axis of the hose 10 of Fig.2, and by rows 6 also  
16 being slanted in relation to an axis parallel to the Y  
17 axis, but following a direction opposite to that of the  
18 lines 5.

19 With this crossed arrangement, and transversal in relation  
20 to the Y axis of the hose, the torque which occurred and  
21 concerned the hose, when the latter was wound on a normal  
22 chain-type mesh-network with essentially longitudinal rows,  
23 is eliminated.

24 In fact, in the specific case of Fig. 2, wherein the rows  
25 are arranged following a transversal direction rather than  
26 a longitudinal one, the rotational force component is  
27 compensated, which occurred because of the spiral winding  
28 of the lines 5.

29 With such a type of network, the forces resulting from the  
30 mesh rows and from the mesh lines, compensate each other  
31 until they eliminate each other, thus making the hose 10  
32 insensitive to the so-called spiral movement effect, when  
33 said hose is subjected to a tension because of the fluid  
34 flowing under pressure.

35 An external layer 7, made of plastic or rubber, secures the

1 thus obtained chain mesh-network on the hose surface, as is  
2 the case, in all the hoses manufactured according to the  
3 known technique.

4 One type of machine weaving the chain mesh-network type  
5 with the mesh rows arrangement being slanted in relation to  
6 the longitudinal axis, is described in the Italian patent  
7 application for invention in the name of the same appli-  
8 cant.

9 It is important to underline that the slant of the mesh  
10 rows can be modified according to selected angles, also in  
11 relation to the hose material, its diameter, the type of  
12 network, the number of reels, the pitch of the lines and  
13 rows, as well as of the type and/or the thread title.

14 Moreover, it will be pointed out, that the tricot-type  
15 mesh-network, shown in the drawing of Fig. 2, can also be  
16 a chain-type mesh-network differing from the tricot type,  
17 it being understood that all the hoses reinforced with  
18 chain types mesh-network presenting mesh rows slanted in  
19 relation to the longitudinal axis of the hose, independen-  
20 tly from the special type of chain mesh-network which is  
21 to be realized still remain within the spirit and the scope  
22 of the invention.

23 Therefore, the same results can be obtained with chain  
24 mesh-networks of the plain tricot type, double tricot or  
25 plain atlas, double atlas, koper and chain, as well as  
26 other chain mesh-network types.

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1 CLAIMS

2 1) A hose (10) comprising, from the interior to the  
3 exterior:

4 - at least one tubular layer (3) of plastic or rubber  
5 material;

6 - a chain-type mesh-network (4) presenting mesh lines (5)  
7 and mesh rows (6), having a tubular shape and being wound  
8 on the external surface of said inner layer;

9 - a possible external layer (7) for the protection of said  
10 meshes, characterized in that said mesh rows are slanted  
11 in relation to the longitudinal axis of the hose.

12 2) A hose according to claim 1, characterized in that  
13 said chain mesh-network presents the lines (5) of said  
14 meshes being slanted in relation to the longitudinal axis  
15 (Y) of the hose following a direction opposite to the  
16 direction of the said mesh rows (6).

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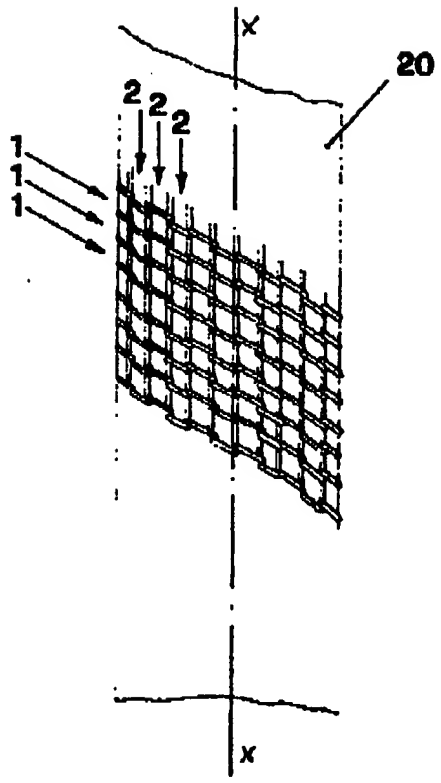


FIG. 1

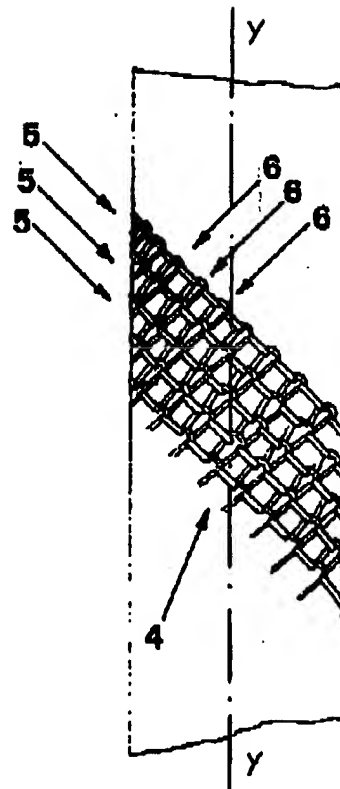


FIG. 2

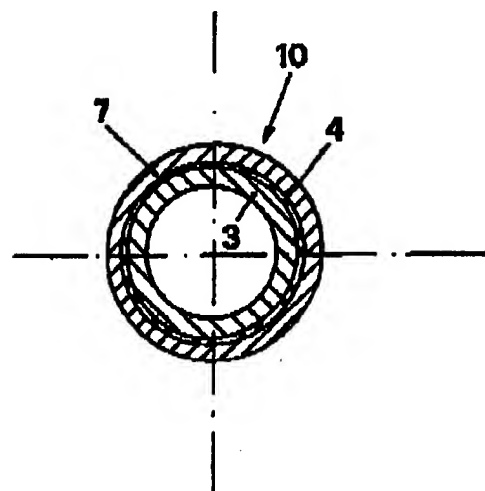


FIG. 3

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